

IMPULSE the change in
momentum

$$\Delta p = m \Delta v$$

change
in 

$$\Delta v = v_f - v_i$$

Brock's AGE CURRENT 16

Brock's INITIAL AGE : 13

$$\Delta \text{Age} = 16 - 13$$

$$\Delta \text{Age} = 3 \text{ years}$$

67" JOE's height final
60" JOE's height in 7th grade

$$\Delta h = 67 - 60 = 7"$$

$$h_f - h_i = \Delta h$$

$$\Delta P = P_f - P_i$$

$$= m \Delta v = m(v_f - v_i)$$

$$\Delta P = m \Delta v$$

$$\Delta v = v_f - v_i$$

Newton's First Law
 Object in motion will stay in motion
 unless it's acted upon by outside force

$$\Delta P = F \Delta t$$

$$\Delta p = F \Delta t$$

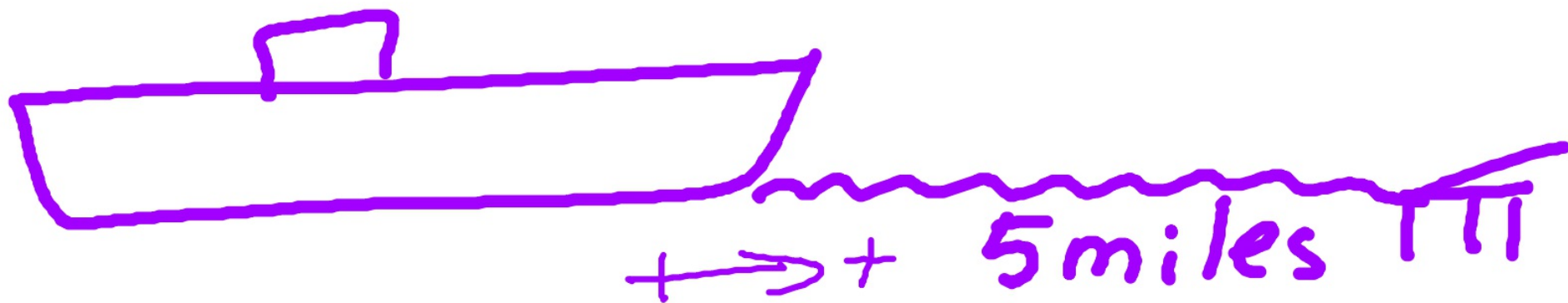
↑ ↘
FORCE CONTACT TIME

Follow through
INCREASES the
Contact time



$$\underbrace{\Delta P}_{\text{CONST.}} = F \underbrace{\Delta t}_{\text{increasing}}$$

↓
Decreases

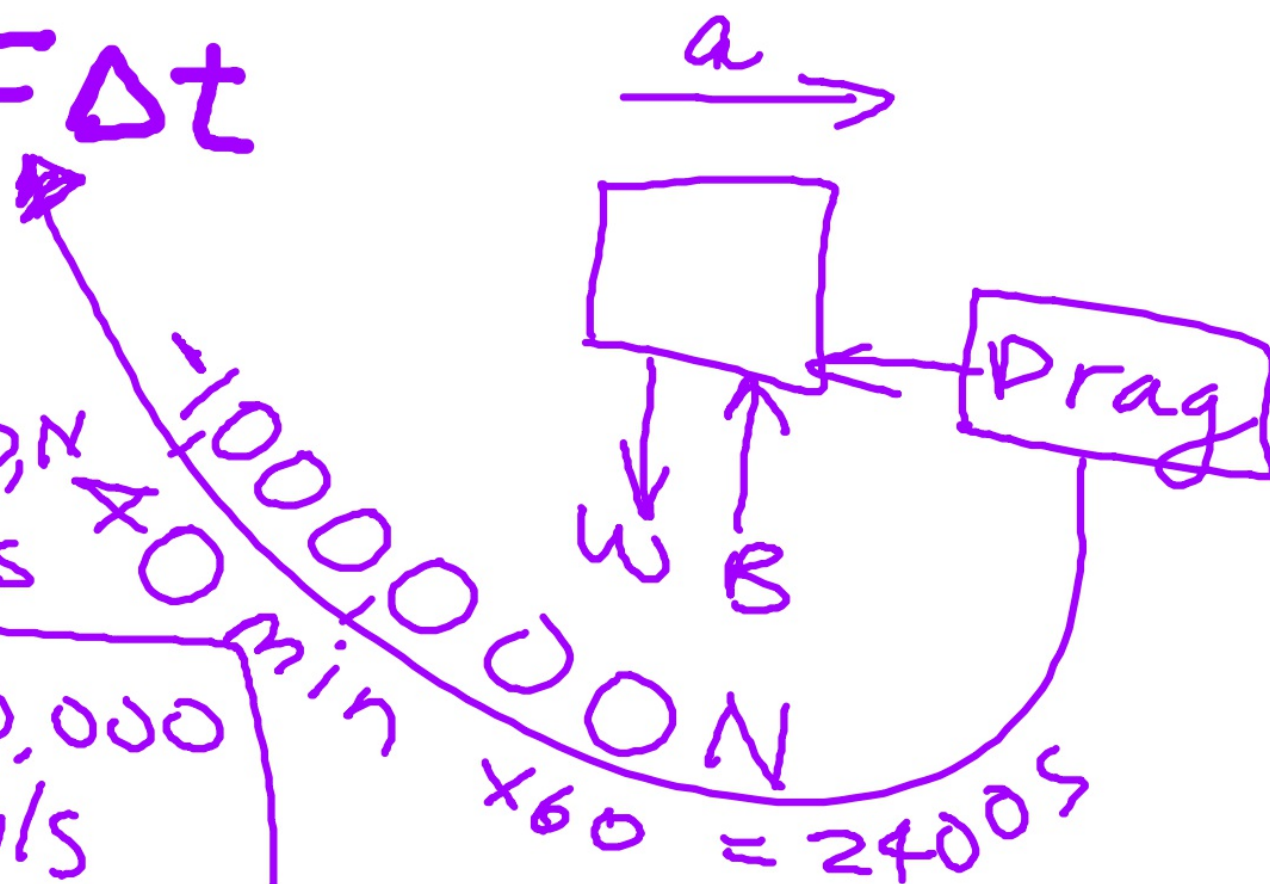


$$\Delta P = F \Delta t$$

$$\Delta F = 1,000,000, N$$

$$\times 2400 s$$

$$\boxed{-2,400,000,000 \text{ kg m/s}}$$



$$\Delta P = -2,400,000,000 \text{ kg m/s}$$

$$m = 12,000,000 \text{ kg}$$

What was the ship's velocity
Before it cut the engines? (v_i)

$$v_f = 0$$

$$\Delta v = \vec{v_f} - v_i$$

$$\Delta P = m \Delta v$$

$$\Delta v = -v_i$$

$$\Delta P = m(-v_i)$$

$$\frac{\Delta P}{m} = \frac{m(-N_i)}{m}$$

$$-N_i = \frac{\Delta P}{m}$$

$$N_i = \frac{-\Delta P}{m} = \left(\frac{-2,400,000,000}{12,000,000} \right)$$

$$N_i \oplus = 200 \text{ m/s}$$



$$v_i = 20 \text{ m/s}$$

$$v_f = 0 \text{ m/s}$$

$$m = .6 \text{ kg}$$

Right is Positive

What is the impulse
of the B-Ball on +

Find $\Delta v = ?$ Backboard?

$$\Delta v = v_f - v_i = 0 - 20 \text{ m/s}$$

$$\Delta v = -20 \text{ m/s}$$

$$\Delta v = -20 \text{ m/s}$$

$$m = .6 \text{ kg}$$

$$\Delta p = m \Delta v \checkmark = (.6 \text{ kg})(-20 \text{ m/s})$$

~~$\Delta p = F \Delta t$~~ $\Delta p = -12 \text{ kg m/s}$

$\Delta t = .75 \text{ sec.}$ How much Force?

$$\Delta p = -12 \text{ kg m/s}$$

$$\Delta p = F \Delta t$$

$$-12 \text{ kg m/s} = F .75 \text{ s}$$

$$F = \frac{-12 \text{ kg m/s}}{.75}$$

$$F = -16 \text{ N}$$

A volleyball has an initial velocity of 8 m/s Right. Jackson Hits the BALL with a FORCE of 15N Left for: .5 seconds. What IS the final velocity of the ball? mass of volleyball is .46kg.

$$V_i = 8 \text{ m/s R Right is } \oplus$$

$$F = -15 \text{ N} \quad m = .46 \text{ kg}$$

$$\Delta t = .5 \text{ s}$$

$$V_f = ?$$

$$\Delta P = f \Delta t$$

$$= -15 \cdot .5$$

$$\Delta P = -7.5$$

$$\Delta P = m \Delta v$$

$$\overline{m} \quad \overline{m}$$

$$\Delta v = \frac{\Delta P}{\overline{m}}$$